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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,670	12/21/2001	Daniel T. Colbert	11321-P011C1D6	1672

7590

05/05/2004

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EXAMINER
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LISH, PETER J

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/027,670	<b>Applicant(s)</b> COLBERT ET AL. 
	<b>Examiner</b> Peter J Lish	<b>Art Unit</b> 1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 84-89 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 84-86 is/are allowed.
- 6) ☒ Claim(s) 87-89 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

Applicant's arguments with respect to claims 87-89 have been considered but are moot in view of the new ground(s) of rejection. The argument that the teaching of Zhang et al. regarding the uniformity of the nanotubes within a bundle cannot be applied to the nanotube bundles of Kiang et al. to show inherency because the nanotube bundles produced by Zhang et al. were produced by a different method from those of Kiang et al. (namely laser ablation vs. arc discharge) is found persuasive. However, newly cited reference to Dresselhaus et al. overcomes this argument.

Regarding applicant's argument with respect to the rejection under 35 U.S.C. 102/103 in light of the expectation of uniform length or helicity of at least two nanotubes within a bundle, applicant is directed to the difference between an inherency argument and a proper 102/103 rejection, the latter of which may properly be made in such an instance where the examiner cannot determine whether the product of the reference contains these claimed properties, yet has reasonable expectation that this be the case.

Where, as here, the reference discloses all the limitations of a claim except a property or function, and the examiner cannot determine whether or not the reference inherently possesses properties which anticipate or render obvious the claimed invention, the burden of proof is shifted to the applicant, as in *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980).

Regarding applicant's arguments with respect to claims 87-89, no difference is seen between the two-dimensional array or assemblies of two-dimensional arrays of the claims, as written, and the bundles of carbon nanotubes of the applied reference.

Regarding applicant's arguments with respect to claims 91-93, In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "a monolayer extending in a direction substantially perpendicular...") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Furthermore, the intended use of the structure does not limit the structure itself.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

#### ***Claim Rejections - 35 USC § 102***

Claims 87-88 are rejected under 35 U.S.C. 102(a) as being anticipated by Kiang et al. ("Carbon Nanotubes With Single-Layer Walls") with Dresselhaus et al. (Carbon Nanotubes: Synthesis, Structure, Properties, and Applications) to show a state of fact.

Kiang teaches that single-walled nanotubes, made by the arc-discharge process, tend to aggregate into bundles. The nanotubes in a bundle run substantially parallel to one another and appear to have uniform diameters (see Figure 2c). Dresselhaus et al. teach that the nanotube material produced by either laser vaporization or the arc-discharge process appears as a mat of carbon bundles or ropes, such as those taught by Kiang et al. The single-walled nanotubes are arrayed in bundles aligned along a common axis; the bundles are then intertwined to form "ropes" (page 6). Additionally Dresselhaus et al. teaches that the bundles produced by the vaporization and the arc-discharge processes contain nearly perfect single-wall nanotubes of

substantially uniform diameter (page 73). Therefore, it is inherent that the bundled single-walled nanotubes of Kiang et al. have a substantially uniform diameter.

Regarding claims 87-88, no difference is seen between the bundles and ropes of single-walled nanotubes of Kiang et al. and the two-dimensional array or assemblies of two-dimensional arrays, each of which comprises single-walled nanotubes in a parallel orientation.

***Claim Rejections - 35 USC § 102/103***

Claim 87-89 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kiang et al. (“Carbon Nanotubes With Single-Layer Walls”) with Dresselhaus et al. (Carbon Nanotubes: Synthesis, Structure, Properties, and Applications) to show a state of fact.

Kiang teaches that single-walled nanotubes, made by the arc-discharge process, tend to aggregate into bundles. The nanotubes in a bundle run substantially parallel to one another and appear to have uniform diameters (see Figure 2c). Dresselhaus et al. teach that the nanotube material produced by either laser vaporization or the arc-discharge process appears as a mat of carbon bundles or ropes, such as those taught by Kiang et al. The single-walled nanotubes are arrayed in bundles aligned along a common axis; the bundles are then intertwined to form “ropes” (page 6). Additionally Dresselhaus et al. teaches that the bundles produced by the vaporization and the arc-discharge processes contain nearly perfect single-wall nanotubes of substantially uniform diameter (page 73). Therefore, it is expected that the bundled single-walled nanotubes of Kiang et al. have a substantially uniform diameter.

Regarding claims 87-88, no difference is seen between the bundles and ropes of single-walled nanotubes of Kiang et al. and the two-dimensional array or assemblies of two-dimensional arrays, each of which comprises single-walled nanotubes in a parallel orientation.

Regarding claim 89, it is not explicitly taught that the individual single-walled nanotubes in a bundle have homogenous lengths or helicities in any given region of the bundle. However, it is expected that at least two adjacent tubes will have the same helicity or the same length due to corresponding growth conditions. Thus it is expected that a region of a nanotube bundle have a homogenous length or helicity in addition to the substantially homogenous diameter, which property is shared by the entire bundle.

#### ***Allowable Subject Matter***

Claims 84-86 are allowed. Reasons for allowance are found in the previous office action.

#### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Lish whose telephone number is 571-272-1354. The examiner can normally be reached on 9:00-6:00 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1754

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PL



**STUART L. HENDRICKSON**  
**PRIMARY EXAMINER**